

WHAT IS CLAIMED IS:

- 1 An aluminum-coated structural member comprising:
a steel substrate layer; and
an Al-Si-Fe alloy layer formed on a surface of the steel
substrate layer, the alloy layer including a softer region having
5 a hardness smaller than or equal to a hardness of the steel
substrate layer, extending from the surface of the steel
substrate layer toward a surface of the alloy layer, and having
a thickness greater than or equal to 50% of a thickness of the
alloy layer, the Al-Si-Fe alloy layer having an oxide weight
10 smaller than or equal to 500 mg/dm².
2. The aluminum-coated structural member as claimed in
Claim 1, wherein the Al-Si-Fe alloy layer has a multi-layer
structure including an inner layer contiguous with the steel
15 substrate layer, and an outer layer forming the surface of the
alloy layer.
3. The aluminum-coated structural member as claimed in
Claim 2, wherein the inner layer is a softest layer in the multi-
20 layer structure.
4. The aluminum-coated structural member as claimed in
Claim 2, wherein the inner layer contains 85~95% Fe, and the
inner layer is softer in Hv hardness than an average hardness
25 of the alloy layer by a percentage more than or equal to 20%.
5. The aluminum-coated structural member as claimed in
Claim 2, wherein the multi-layer structure of the Al-Si-Fe alloy
layer further comprises an intermediate layer containing

25~40% Al, and the intermediate layer is lower in hardness than the steel substrate layer.

6. The aluminum-coated structural member as claimed in
5 Claim 2, wherein the multi-layer structure of the Al-Si-Fe alloy layer further comprises a plurality of intermediate layers, at least one of the intermediate layers containing 25~40% Al, and being lower in hardness than the steel substrate layer.
- 10 7. The aluminum-coated structural member as claimed in Claim 2, wherein the outer layer of the Al-Si-Fe alloy layer is harder than the steel substrate layer.
8. The aluminum-coated structural member as claimed in
15 Claim 2, wherein the outer layer contains 35~50% Fe.
9. An aluminum-coated structural member comprising:
a steel substrate layer; and
an Al-Si-Fe alloy layer formed on a surface of the steel
20 substrate layer, the Al-Si-Fe alloy layer having a multi-layer structure including an inner layer contiguous with the steel substrate layer, an outer layer forming a surface of the alloy layer and an intermediate layer formed between the inner and
25 outer layers, the inner layer containing 85~95% Fe, the intermediate layer containing 25~40% Al, and the outer layer being harder than the steel substrate layer.
10. A production method of an aluminum-coated structural member comprising:
30 heating a hot-dip aluminum-coated steel sheet at a heating rate in a range of 1~10°C/sec;

holding the hot-dip aluminum steel sheet at a raised temperature in a temperature range of 900~950°C for a duration in a range of 2~8 minutes;

5 cooling the hot-dip aluminum-coated steel sheet to a temperature in a temperature range of 700~800°C at a cooling rate in a range of 5~15°C/sec;

forming the hot-dip aluminum-coated steel sheet into a predetermined shape in the temperature range of 700~800°C; and

10 cooling the hot-dip aluminum-coated steel sheet in the predetermined shape rapidly from the temperature range of 700~800°C to a lower temperature lower than or equal to 300°C at a cooling rate in a range of 20~100°C/sec.